

**2014 Cattle Canyon
Visitor Use Survey
Lower Canyon Area of Project Site**

FINAL REPORT

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Robert Brown, Ph.D.
California State University, San Marcos

Jerrell Ross Richer, Ph.D.
Goshen College

Project Background

The Watershed Conservation Authority (WCA) partnered with the Angeles National Forest (ANF), the Rivers and Mountains Conservancy (RMC), and other stakeholders to implement ecological and recreational improvements on East Fork San Gabriel River (SGR) at Cattle Canyon Confluence. The project, designed to significantly reduce visitor impacts to sensitive natural resources and habitat along East Fork San Gabriel River as well as improve recreation, comprised two components – *physical site improvements* and an experimental *Interpretive/Education Program*. The *Interpretive/Education Program* aimed to engage recreation visitors along SGR through direct contact and messaging by staff stationed at interpretive booths and also roaming the river. Program messaging targeted litter removal, resource conservation (specifically to discourage constructing rock dams), public land stewardship, and fire danger awareness to visitors along the SGR during the summer season.

During summers 2013-14, Cal State University San Marcos (CSUSM) partnered with the WCA to assess the *Interpretive/Education Program* on East Fork SGR through a Visitor Use Survey. The main charge was to monitor the effectiveness of the *Interpretive/Education Program* by measuring both visitor learning (from the Program) and any resulting observed changes in visitor behavior on the river environment. (During 2013, the Visitor Use Survey also solicited feedback about physical site improvements to improve the quality of recreation and prevent further degradation, information to help inform future physical site improvements.)

The CSUSM team used the following methods to measure visitor learning and behavioral outcomes resulting from the Education Program – the onsite visitor survey (including assessment questions aimed at specific learning outcomes) administered to East Fork SGR visitors, GPS documenting of trash levels in the river and trash bins, collecting vehicle and visitor use counts, and photo documenting/mapping changes to the river occurring from the construction of rock dams and natural events. Specifically, the Visitor Use Survey project was charged with the following objectives:

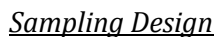
- Determine visitor level of awareness of public land use ethics and stewardship.
- Assess visitor knowledge of resource management challenges and ways to prevent resource degradation.
- Solicit feedback about the type of site improvements that best improve recreation quality

Collect data to assist in evaluating the project benefits pertaining to the Interpretive/Educational Program and other support activities.



Collect visitor responses to inform stakeholder input in physical site improvements.

Collect trash assessment data along the river and surrounding area.

Conduct onsite surveys on weekends/holidays from Memorial Day weekend to Labor Day weekend during Summer 2013 and 2014 (31 days per survey year).

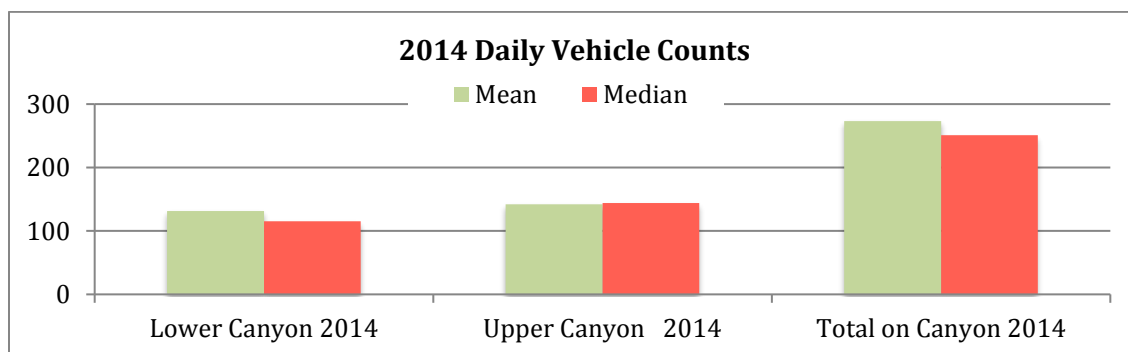


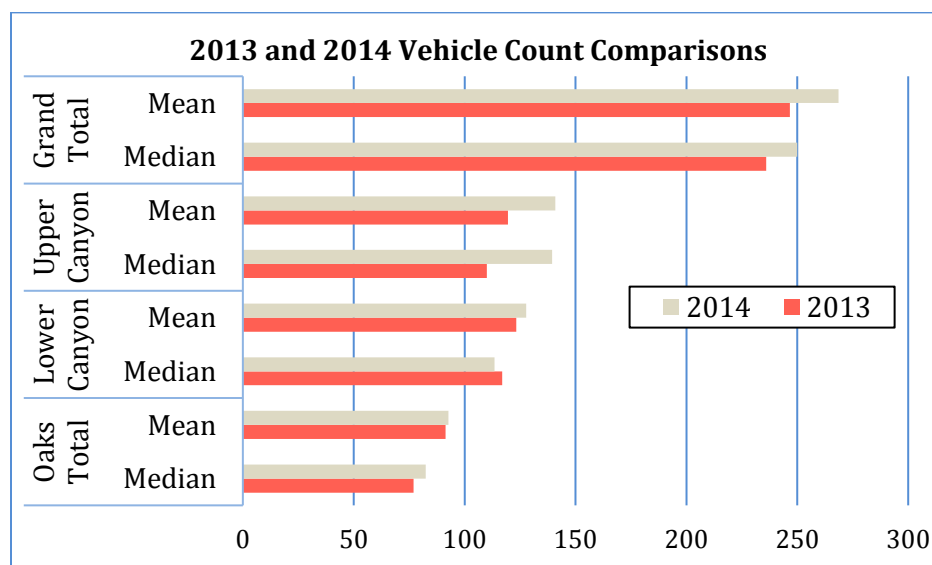
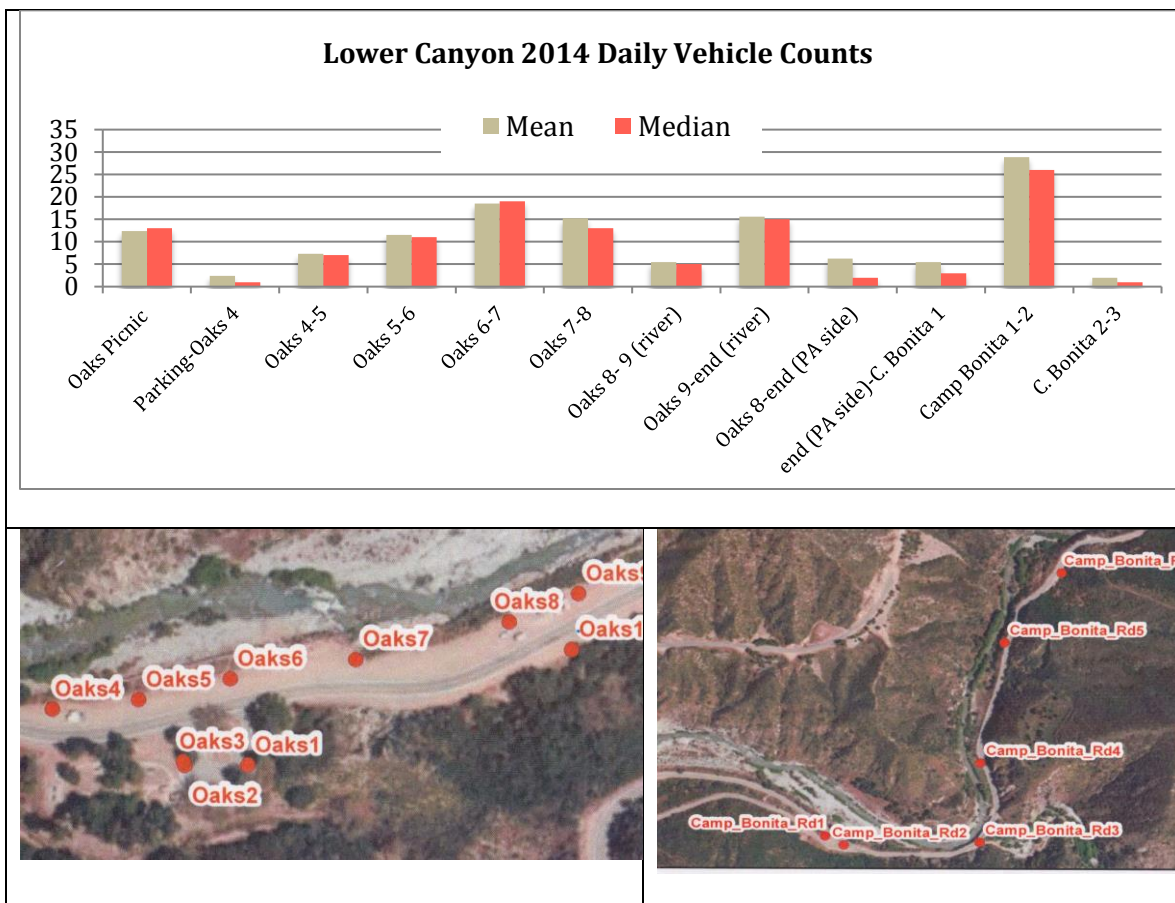
Dispersed recreation and *wilderness recreation* are two different, and important, types of recreation use (visitor groups) in the Project area. On summer weekends along the Lower Canyon area, visitors park their vehicles at the Oaks Picnic Area or at turnouts along East Fork Road and then trek down and disperse along the SGR. This dispersed recreation tends to be comparatively invasive to the natural environment, both because of the high numbers of visitors and the intense nature of the recreation (building rock dams to form swim holes, trash not removed, etc.) The Visitor Use Survey focused primarily on this intensive dispersed recreation use along the Lower Canyon portion of the project area (although the team also sampled on the Upper Canyon.) This summary report focuses on preliminary results from the sampling on the Lower Canyon area.

Examples of Recreation Use on Lower Canyon	
<p>High-Use Day on 6/8/2014 (large church group)</p> 	<p>Low-Use Day on 6/29/2014 (Mexico plays in World Cup)</p> 

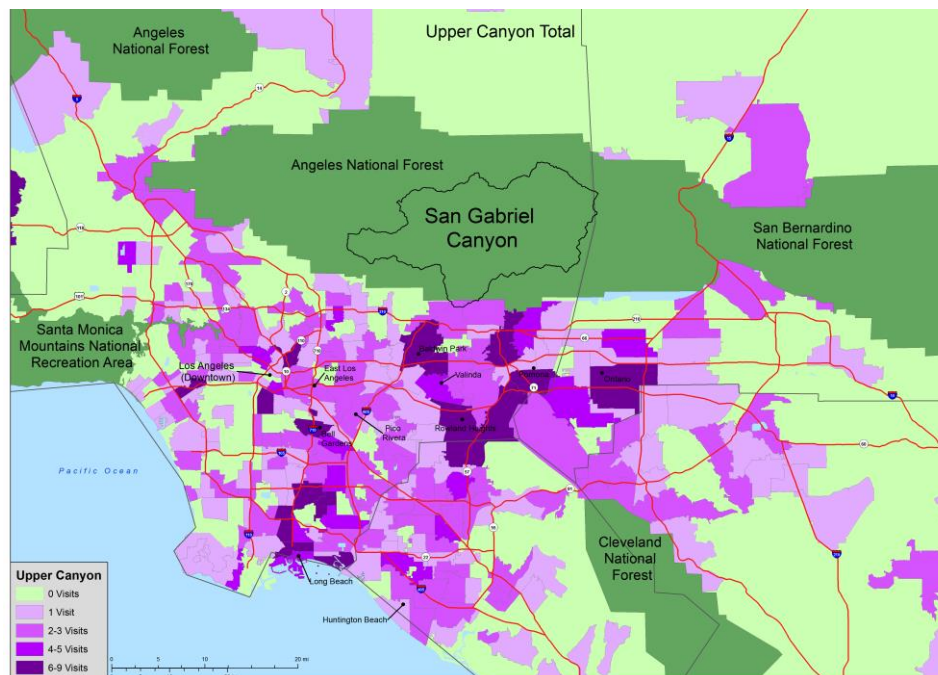
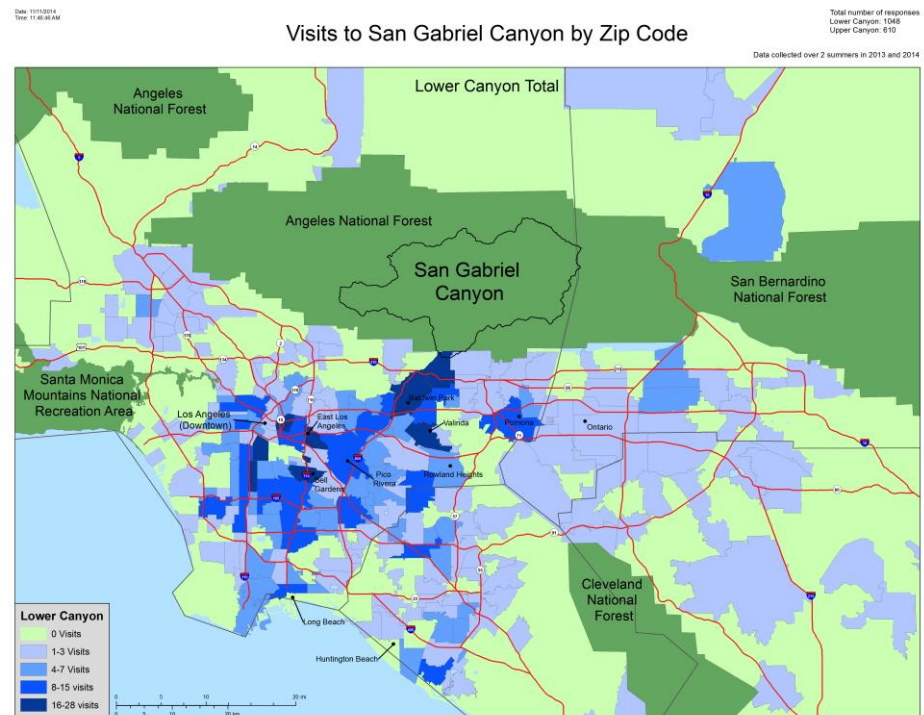
Vehicle Counts and Visitor Use

The CSUSM team collected vehicle counts along the project area on each survey day as a way to approximate (and control for) visitor use levels. There averaged 273 total vehicles per survey day across the project site, averaging 131 vehicles on the Lower Canyon and 142 vehicles along the Upper Canyon. Furthermore, the visitor use survey data reported an average 5.1 visitors per vehicle among the Lower Canyon visitors (668.1 visitors per day) and 3.1 visitors per vehicle for Upper Canyon visitors (440.2 visitors per day.) The following tables show the 2014 daily vehicle counts on the project area, the distribution of vehicles counts along the Lower Canyon area, and vehicle count comparisons between 2013 and 2014.





The maps below compare visitor respondent zip codes (for summers 2013 and 2014) between the Lower Canyon visitors (top map) and Upper Canyon visitors (bottom map.) Looking at the Lower Canyon mapping, relatively high numbers of visitors reside in zip codes located along the I-605 corridor, then fanning out across eastern Los Angeles County (south of the 60 freeway) into downtown Los Angeles, and then the south/southeastern parts of Los Angeles County.



Summer 2014 Initial Findings

During the second summer (2014) of fieldwork, the CSUSM team refined the assessment of the Education Program to better measure (1) the degree to which visitors learned/retained information after engaging with the Education team and (2) whether contact with the Education team positively changed visitor behavior (e.g., trash levels on SGR, rock dam construction.) Specifically, the CSUSM team established the following objectives for Summer 2014 in collaboration with the WCA:

- Improve tracking of Education Program staff interaction with visitors; that is, to precisely document the number of visitors that the Education team contacted each day. Data collection methods included counts of trash bags distributed by Education team, hand tally counts of visitor participation at the interpretive booths, hand tally counts of visitors engaged along the river, and observation of wrist bans distributed at interpretive booths.
- Design questions to better *assess visitor retention of program learning outcomes* (see questions 4.15 through 4.23 on attached survey instrument.)
- Improve data collection on *observable visitor behavioral outcomes* (photo documentation of rock rams, collecting trash data in trash bins, and rapid trash assessment methods.)

2014 Preliminary Survey Results

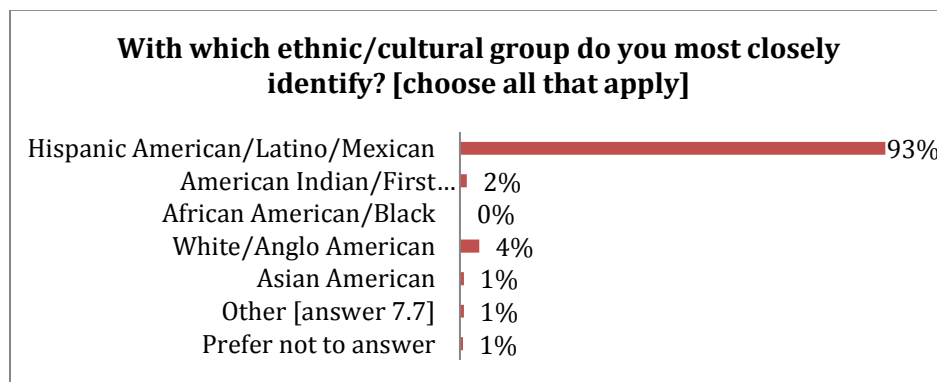
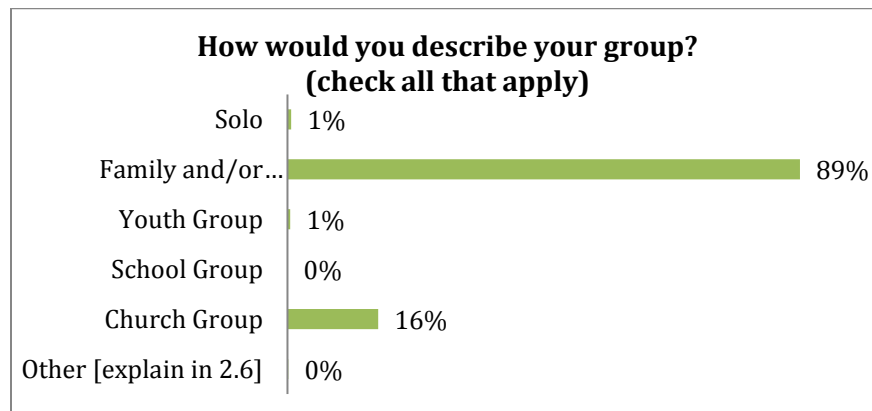
The Educational Program was implemented on the Lower Canyon of the project site; the remainder of this report summarizes 2014 Visitor Use Survey results collected from visitor respondents on the Lower Canyon. The analysis includes sampling information, visitor characteristics, rates that visitors participated with the Education Program, and preliminary assessments of the Education Program. The CSUSM team surveyed 31 weekend and holiday days in Summer 2014, between approximately 2:30PM and 6:30PM. The Educational team implemented their outreach program between approximately 9:00AM and 2:00PM each day on the river, with scheduled absences on two weekends to provide a control comparison. In addition, Education team was absent on two days due to fire and flood, for a total six days absent during the survey period.

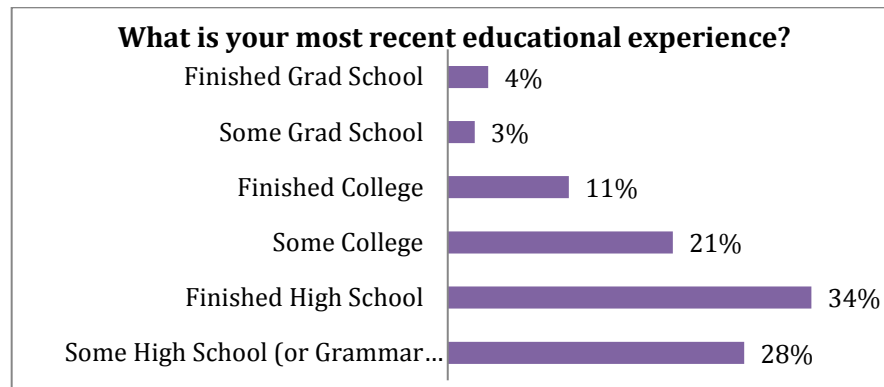
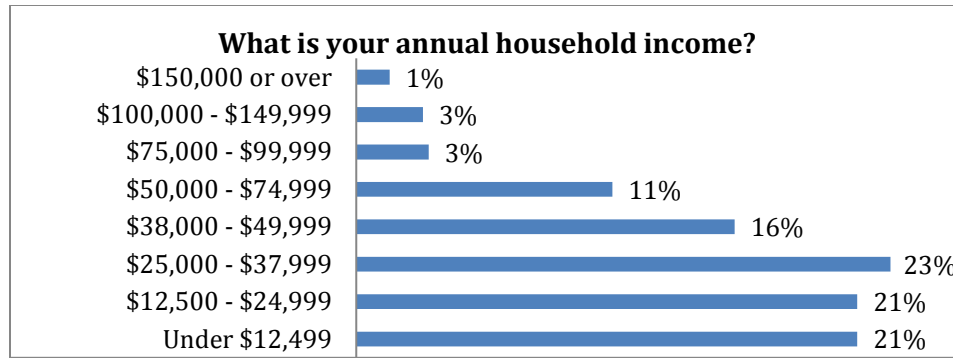
2014 Sampling Schedule							
Month	Date	Day	Weekend	Holiday Weekend	Program On/ Off		
May	25	Sun	1	Memorial Day	Off		
	26	Mon					
	31	Sat	2				
June	1	Sun	3		On		
	7	Sat					
	8	Sun					
	14	Sat					
	15	Sun					
	21	Sat					
	22	Sun					
	28	Sat					
29	Sun	6	4th of July				
July	5	Sat				7	
	6	Sun				8	
	12	Sat					
	13	Sun					
	19	Sat					
	20	Sun					
	26	Sat					
	27	Sun	10	Off			
August	2	Sat	11		On		
	3	Sun			Off (flood)		
	9	Sat			12	Off	
	10	Sun					
	16	Sat				Off (fire)	
	17	Sun			13		
	23	Sat					14
	24	Sun					
	30	Sat			15	On	
31	Sun						
September	1	Mon		Labor Day			

Visitor Characteristics

SGR visitors are predominantly families, friends, and church groups escaping stresses of work and urban life; they picnic, camp, water play, and view scenery. In short, visitors connect with each other and the environment. CSUSM data collected in summer 2014 indicate that SGR visitors comprise groups with historically limited access to outdoor recreation opportunities – some 93 percent were Latino/Hispanic, 65 percent with household incomes under \$40,000, few had educations beyond high school, most reside in densely populated LA County neighborhoods (see zip code maps.) Furthermore, Los Angeles neighborhoods with higher concentrations of poverty, minorities, and population densities exhibit lower acreages of parks per capita than affluent suburbs. Thus, SGR visitors presumably emanate from neighborhoods with inadequate availability of environmental recreation, inducing them to travel to congested forest areas on the urban fringe.

Visitor Group Size	
How many people (including you) traveled here in the same vehicle as you? <ul style="list-style-type: none">• Average: 5.1; Median: 5• Standard Deviation: 3.3• High: 50	How many people (including you) were in your recreation group today? <ul style="list-style-type: none">• Average: 14.1; Median: 9• Standard Deviation: 24.4• High: 400





Visitor Contact with the Educational Program

The CSUSM Visitor Use Survey aimed to measure the degree to which the Education team engaged/contacted visitors along the Lower Canyon. The Educational team could make contact with any given visitor in two ways: (1) the visitor walked to the interpretive exhibit and/or (2) the “Watershed Rangers” (team members roaming the river) engaged with a visitor along the river. In addition, the Educational team could interact with survey respondents and/or other persons in the respondent’s group. Therefore, interviewers asked visitors four questions, each measuring different degrees of contact/engagement between visitors and the Education team:

“Today the Watershed Rangers hosted an educational outreach program along the river”

1. *“Did you visit the shade canopy with displays?”*
2. *“Did others in your group visit the shade canopy with displays?”*
3. *“Did you interact with Watershed Rangers roaming along the river?”*
4. *“Did others in your group interact with the Watershed Rangers roaming along the river?”*

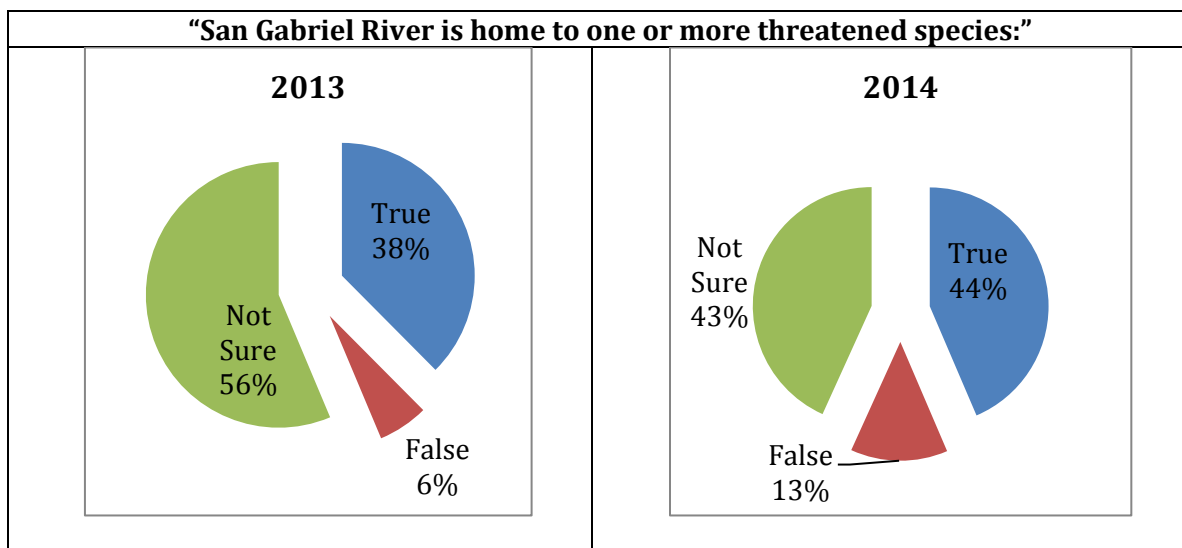
Participation Rates (Contact with Educational Team)	Summer 2013	Summer 2014
Canopy – You or others in your group visit the shade canopy with displays	19%	11%
Roaming – You or others in your group “interacted with Watershed Rangers roaming along the river”	18%	13%
Participant (Canopy &/or Roaming)	24%	16%
Non-Participant (neither Canopy &/or Roaming)	76%	84%
Previous Participant (on previous visit)	n.a.	8%

The participation rates reported above fail to consider that a visitor arriving to the site after 2:00PM, at which time the Educational Team exited the site, would not be a candidate for the program. To more accurately measure participation rates, we define a visitor “candidate” for the Educational Program as one who had the opportunity to engage with the Educational Program; that is, one who (1) visited in the lower canyon in 2014, (2) on a day when the Educational Program was in operation, and (3) arrived at the site before 2:00 pm. Using these criteria, 68% of Lower Canyon visitors recreated when the Educational Program was in operation, 82% of visitors arrived before 2:00 pm, and 53% of the visitors fit both qualifications, i.e. are “candidates.”

2014 Participation Rates (Contact with Educational Team)		
<i>Educational Program</i>	<i>All Visitors</i>	<i>Candidates</i>
Canopy	11%	19%
Roaming	13%	21%
Participant (Canopy &/or Roaming)	16%	28%
Non-Participant (neither Canopy &/or Roaming)	84%	72%
Previous Participant	8	10%

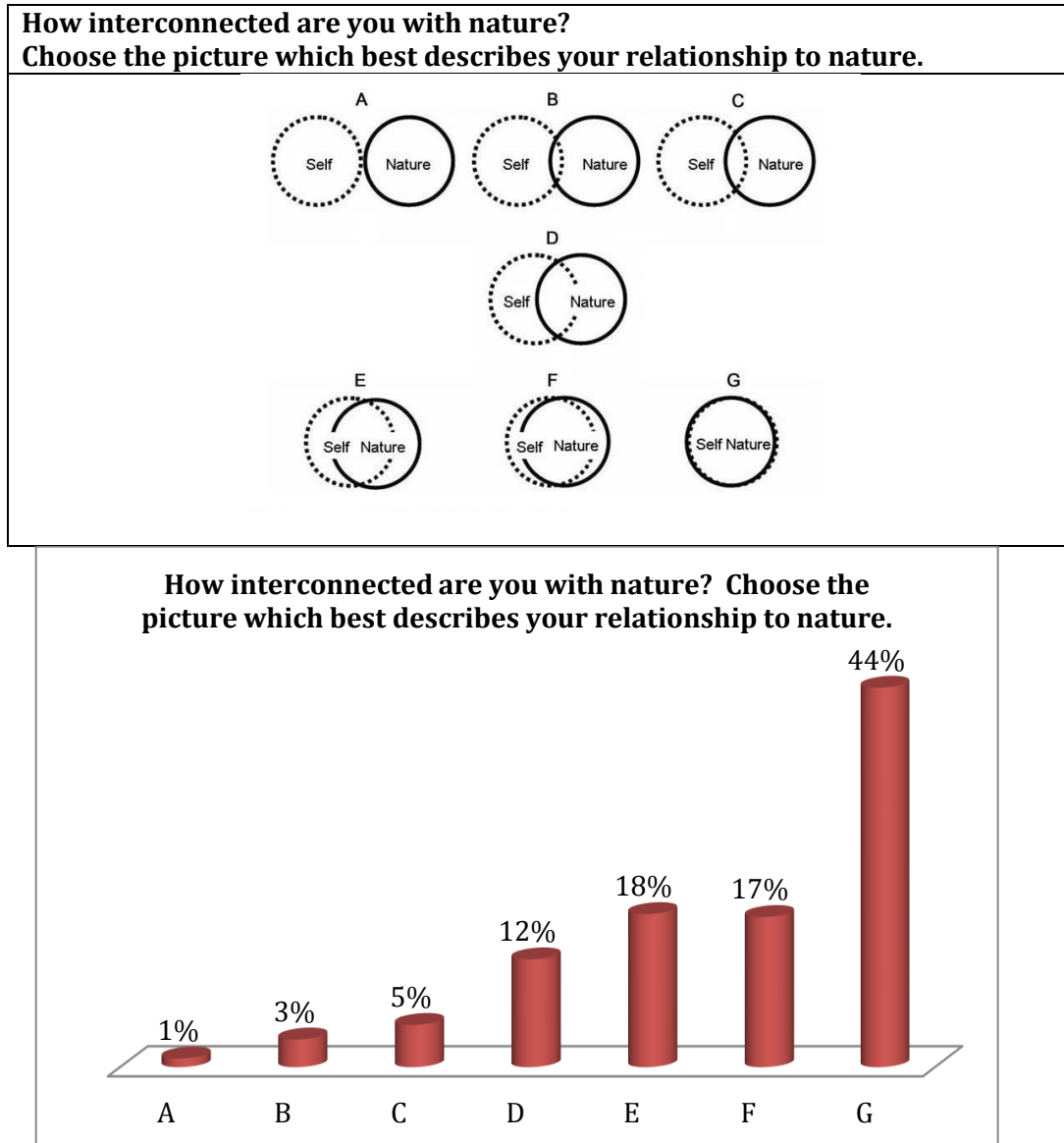
Assessment Questions

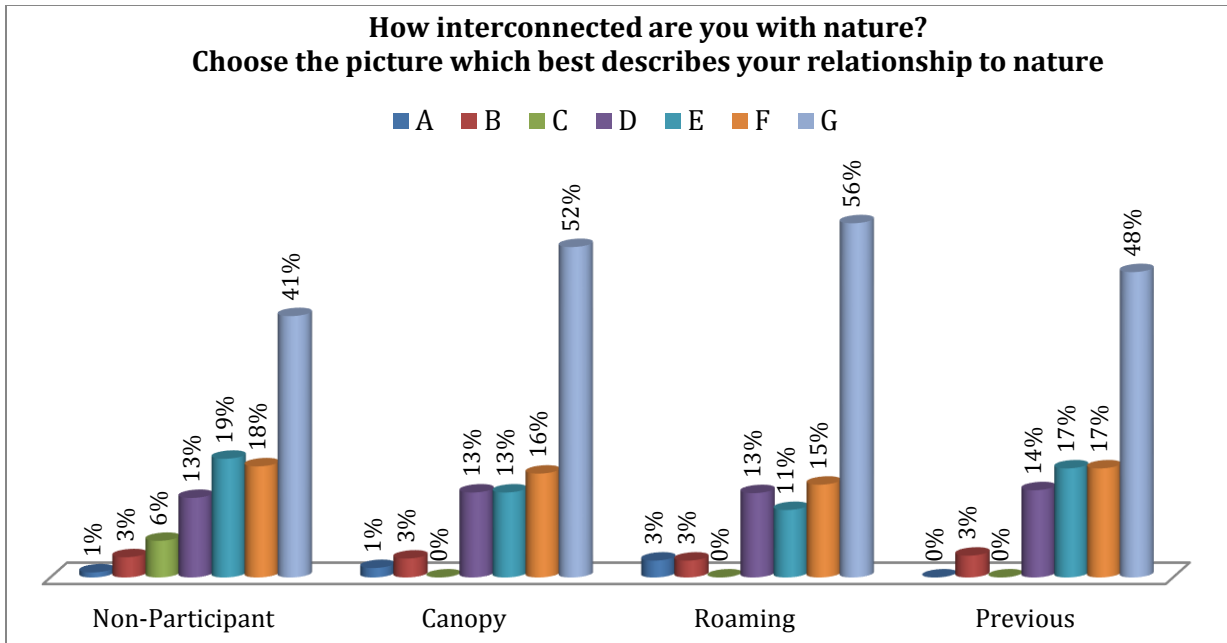
The Visitor Use Survey revised the Educational Program assessment questions in Summer 2014, leaving only one item (“San Gabriel River is home to one or more threatened species”) that was common to both summer surveys. The table below compares the 2014 responses to 2013 responses this particular true/false question, showing a six percent increase in the correct “True” answer.



Inclusion with Nature in Self

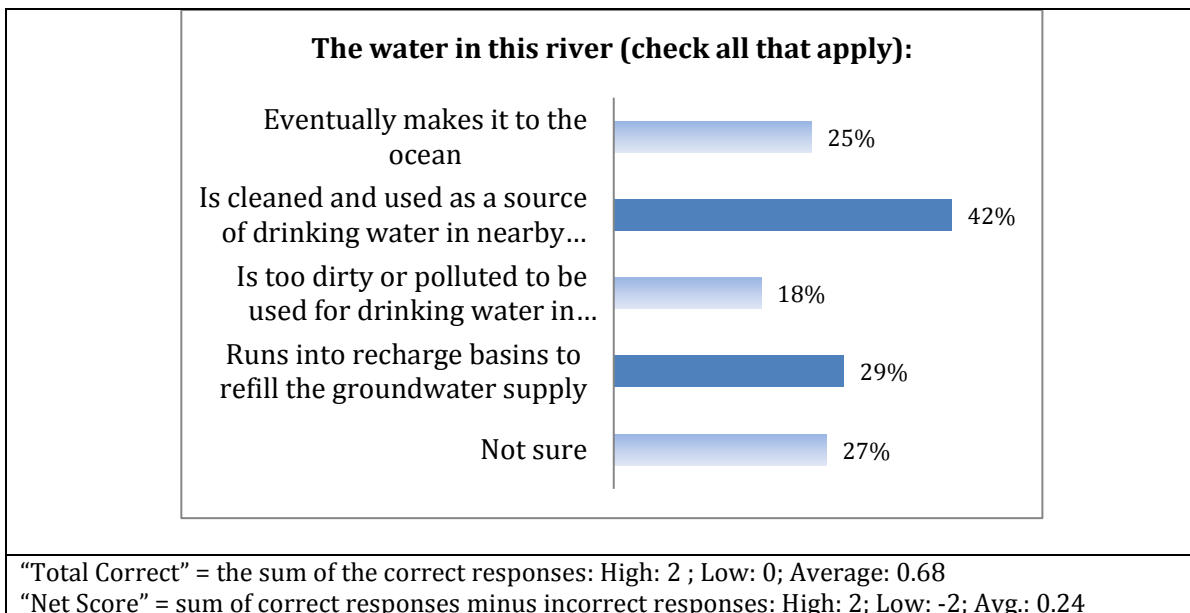
The Visitor Use Survey also measured Inclusion with Nature in Self (INS) to assess the closeness of a respondent's relation/connection to nature. The INS scale comprises a series of overlapping circles with the labels "Self" and "Nature." Respondents were shown the diagram (below) and asked to identify the image that best describes their relationship with nature. This scale has been found to correlate positively with various measures of environmental attitudes and behaviors (see "Inclusion with Nature: The Psychology of Human-Nature Relations," by P. Wesley Schultz, in *Psychology of Sustainable Development*, edited by Peter Schmuck and Wesley P. Schultz. Kluwer Academic Publishers.)

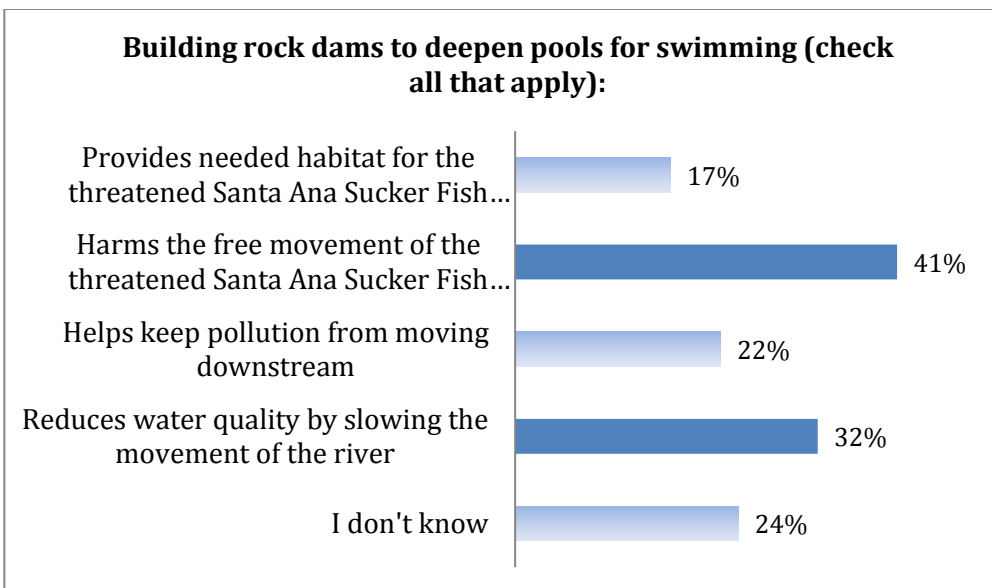
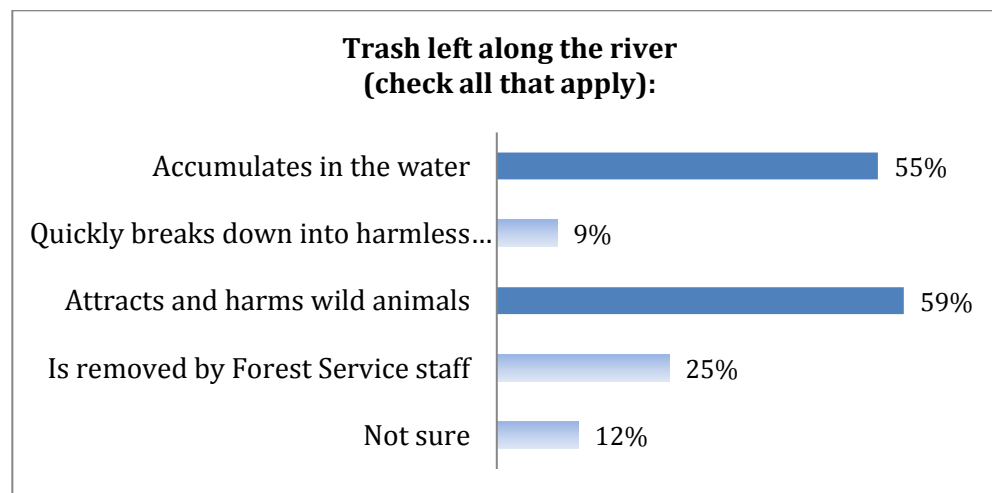
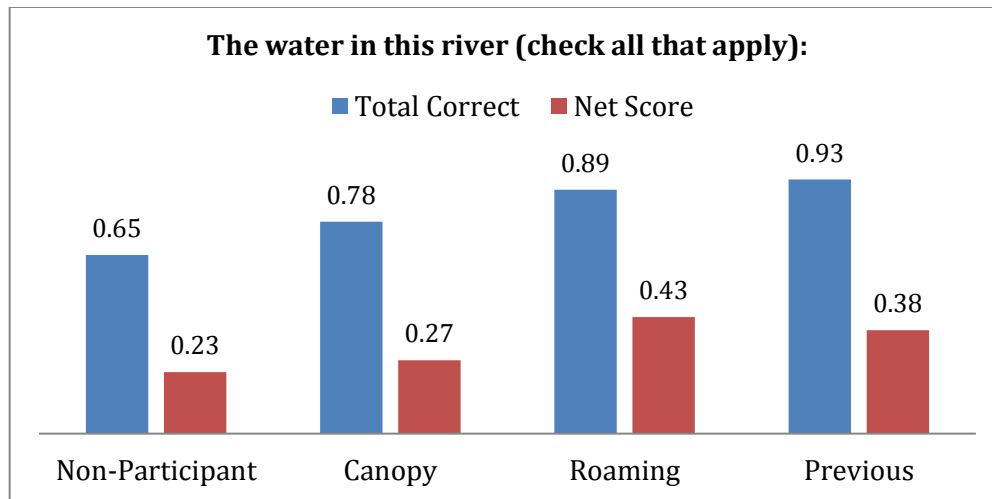


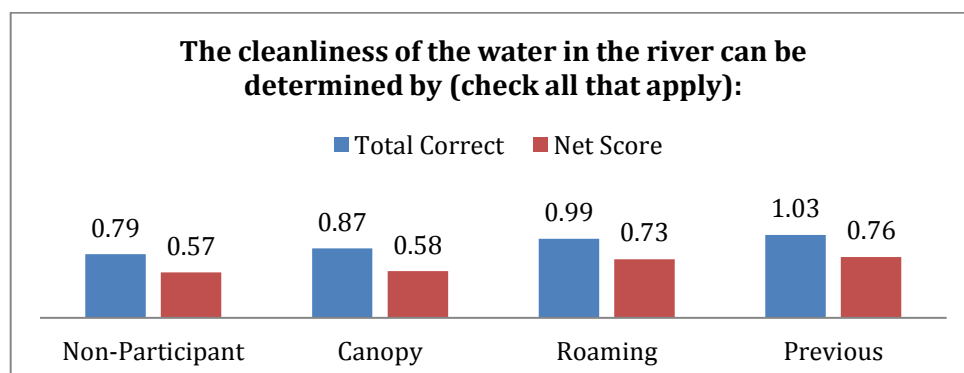
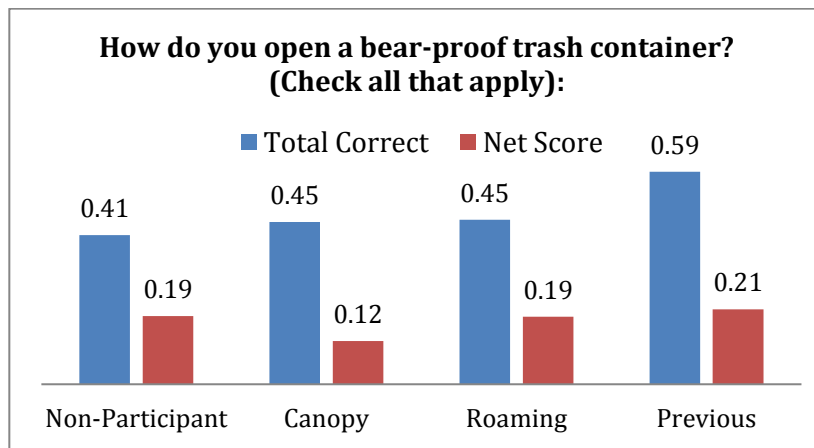
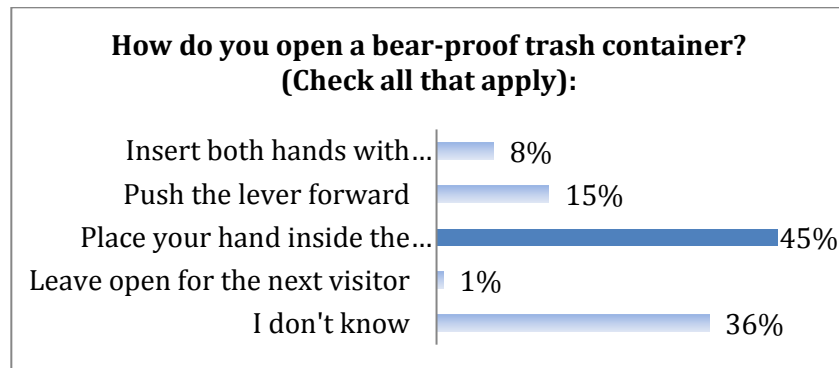
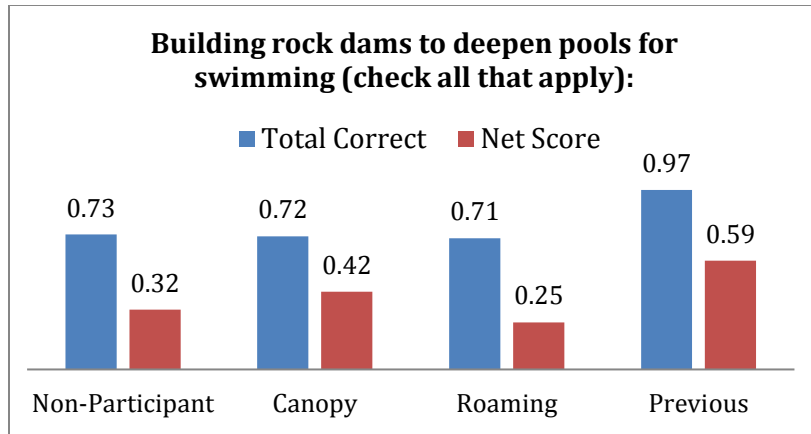


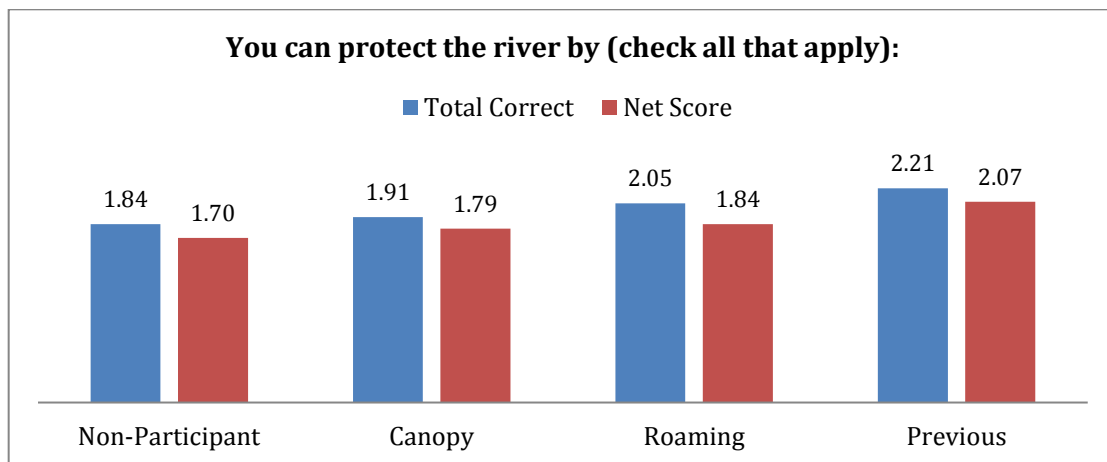
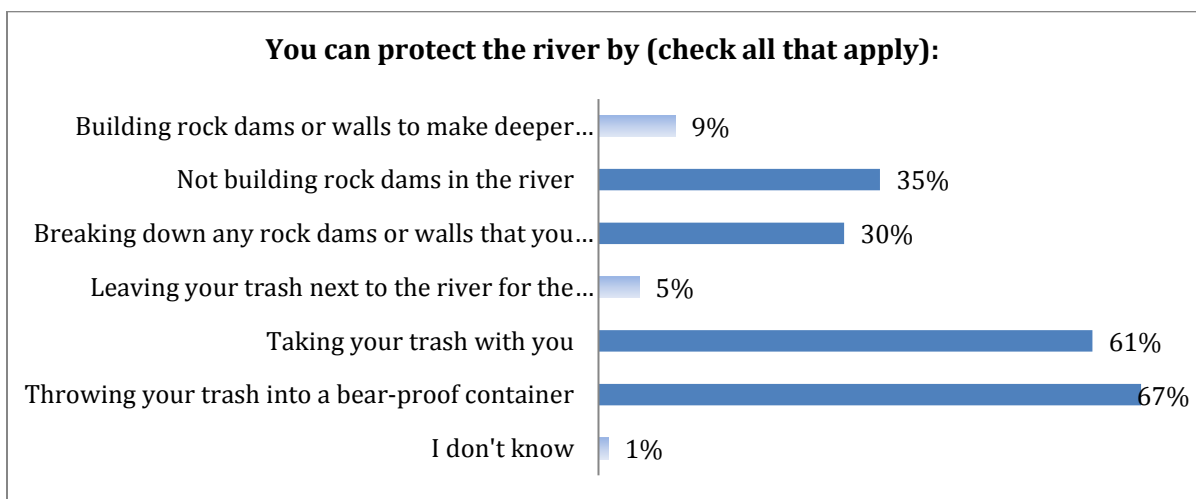
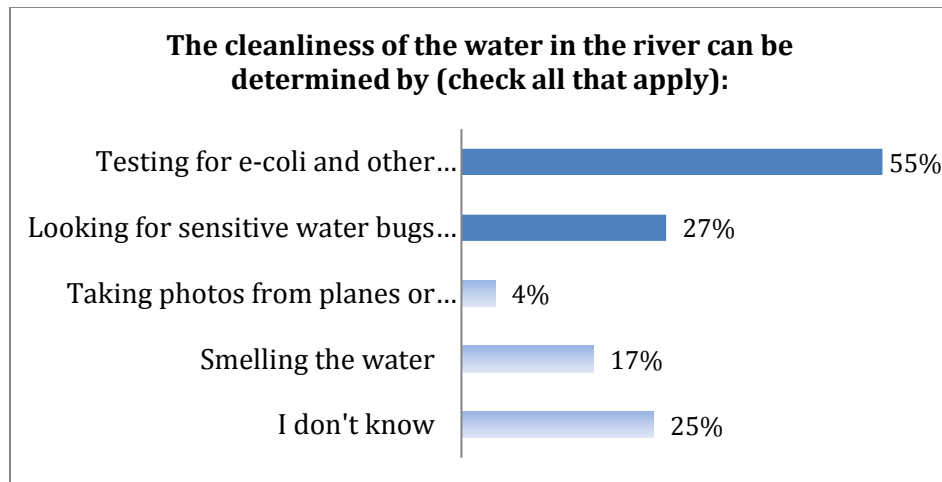
Assessment Questions added to the Summer 2014 Survey

The Summer 2014 survey instrument included five additional questions aimed at better assessing specific learning outcomes emphasized by the Education Program. The following tables report the percentage of visitor responses for each new answer (darker blue bars denote correct answers.)



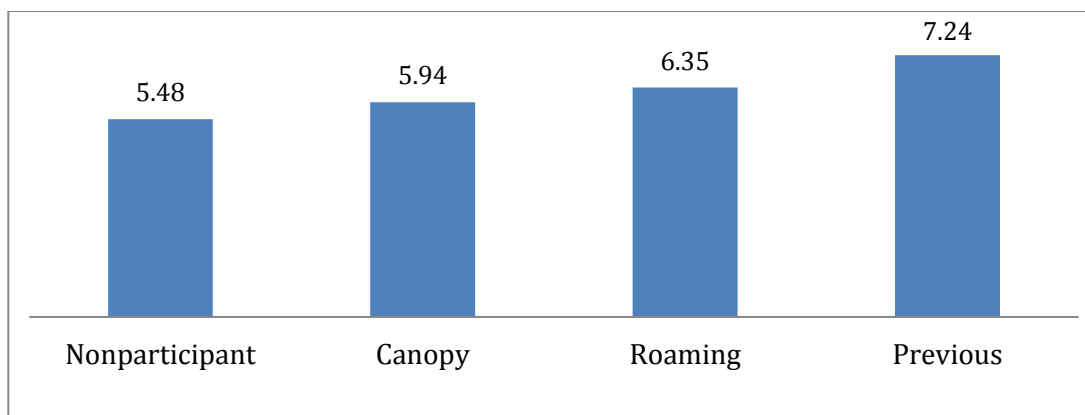




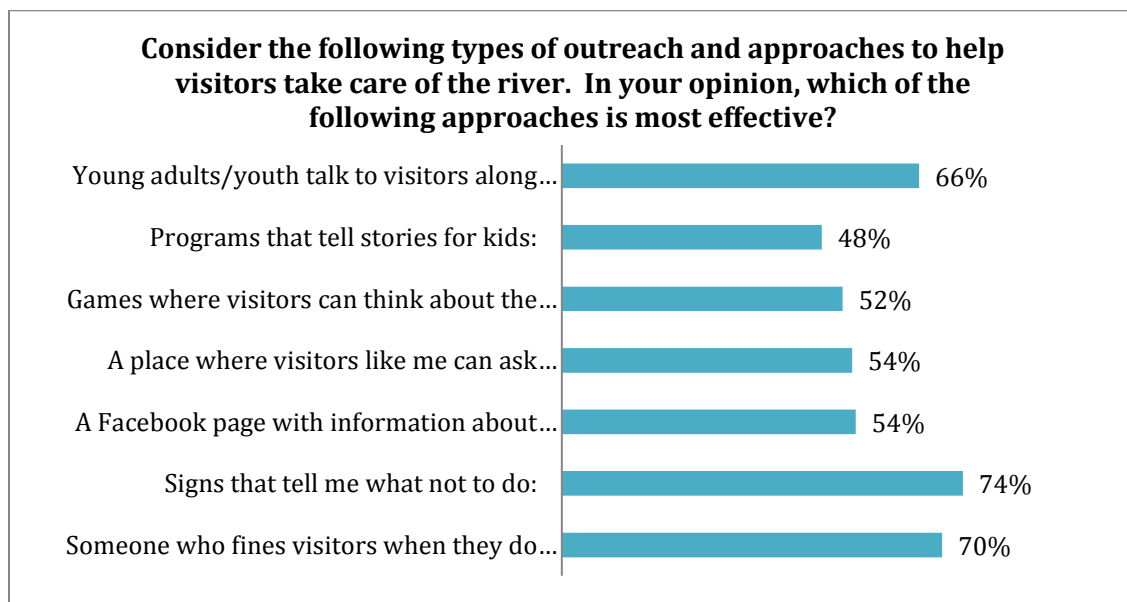


Adding it All Up: The Sum of Correct Answers

The “sum of the total correct answers,” or the total number of correct responses to all six assessment questions, provides some overall measure of learning/retention among visitors who participated in the Education Program. The highest score reported was 14, the lowest zero, with mean 5.55 and median 5. The following table compares the “sum of total correct answers” between non-participants (did not interact with Educational team), respondents who participated at the canopy (stationary interpretive booth), respondents who interacted with roaming Educational team members, and visitors who participated on a previous visit. The table indicates anecdotal evidence that at least some learning occurs among participants, with the highest scores reported among repeat participants. Moreover, the participants who interacted with the roaming team reported higher scores than those who visited the canopy booth, not surprising given the program emphasis on roaming during most of the summer. (The results does not imply statistical significance.)



Visitors were also asked about the perceived effectiveness of various types of outreach approaches, reporting that “signage” and “fines when visitors do the wrong thing” were the most effective approaches to care for the river, followed by the Educational Program approach of “talking to visitors along the river about how to help care for it.”



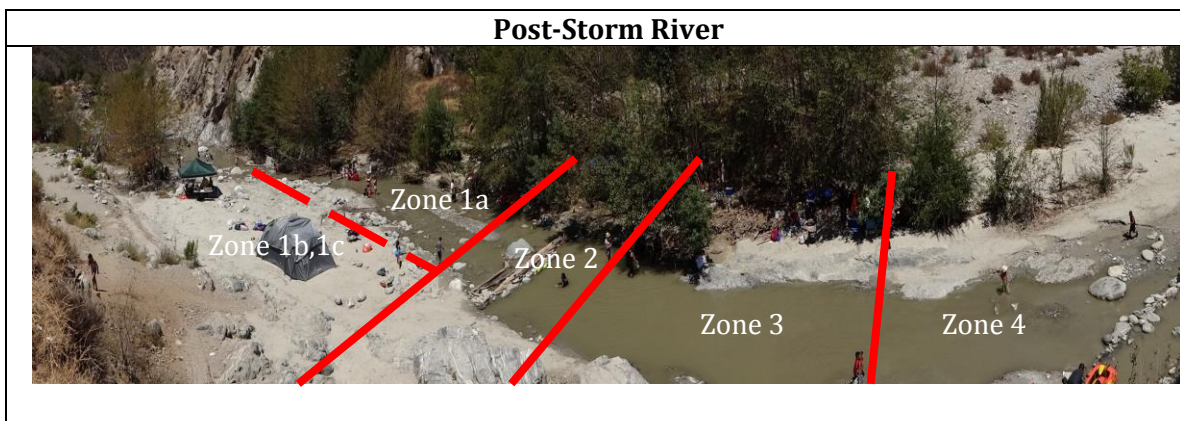
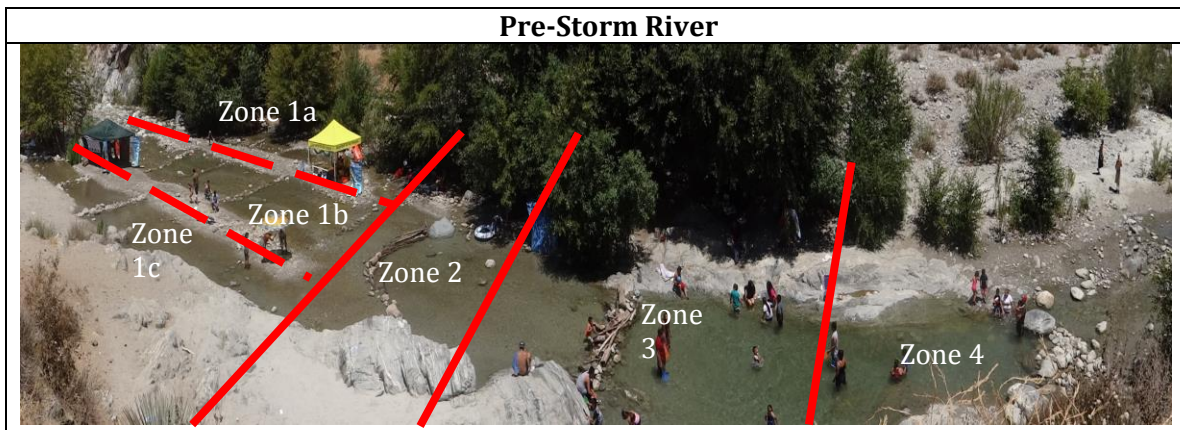
Summary of Initial Findings on Educational Program and its effectiveness:

- 19% of the visitors surveyed reported visiting the shade canopy with displays
- 21% reported interacting with Watershed Rangers roaming along the river
- Added together, 28% participated in the Education Program by either visiting the canopy, interacting with the Watershed Rangers, or both.
- Participation in the program increased visitor knowledge and awareness – correct answers to the assessment questions were 8% higher for canopy visitors and 16% higher for visitors interacting with the watershed rangers roaming the river; however, we cannot unambiguously say that this increase is a result of the program content or that individuals more inclined to interact with the Education team are also more likely to correctly answer the assessment questions (independent of whether they interacted with the team.)
- Outcomes were stronger for program aspects related to water and trash, and weaker on aspects related to rock dams
- Survey respondents indicated that signage and enforcement are most effective approaches for helping visitors take care of the river

Measuring Observable Behavior:

A key question is whether the Educational Program had any positive observable effect on the construction of rock dams over the course of the summer: An important objective of the Educational Program was to discourage visitors from constructing rock dams; therefore, a highly effective program should result in less rock dam construction, other factors constant. This section describes the data collected over the summer that can be used to measure incremental changes in the rock dams across survey days. On each survey day, our team documented photos of the most heavily used locations on the river, taken from pre-determined GPS coordinates.

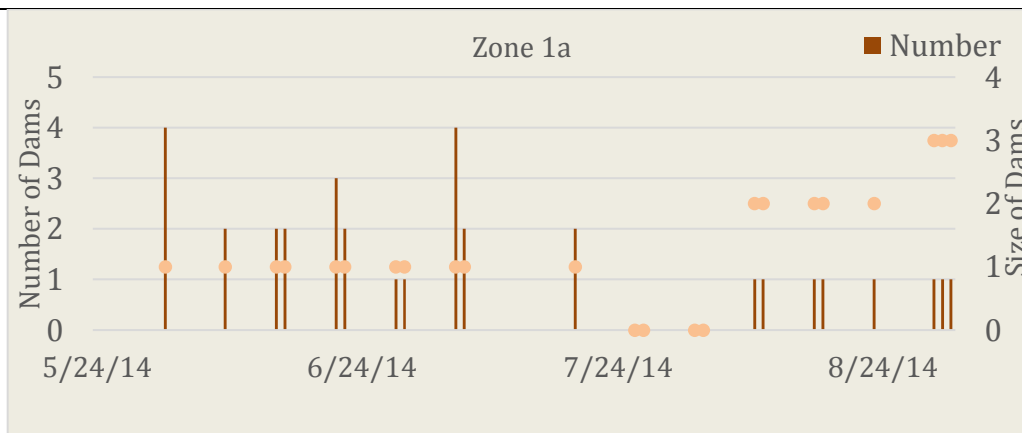
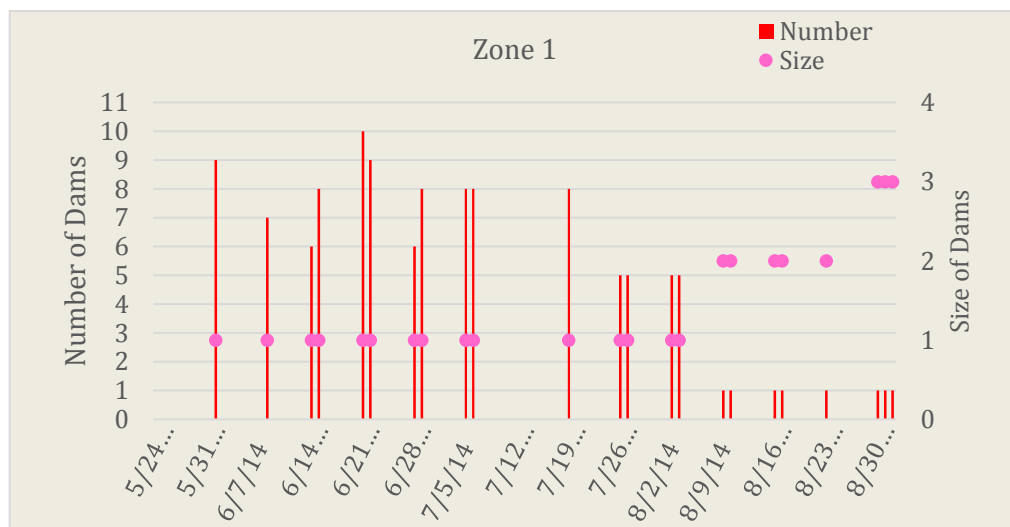
We propose to section the river into zones and then measure the changes in rock dams using GPS reference points to fixed physical features along the river. The following two diagrams illustrate different zones for both the “pre-storm” and “post-storm” river (large storm in mid-summer washed out all previously constructed rock dams.) Initially, many small dams spread across three branches of the river. As the water level decreased over summer, zone (1a) was disconnected from the river; after a large storm occurred in mid-summer, the primary dam continued to expand through Labor Day.

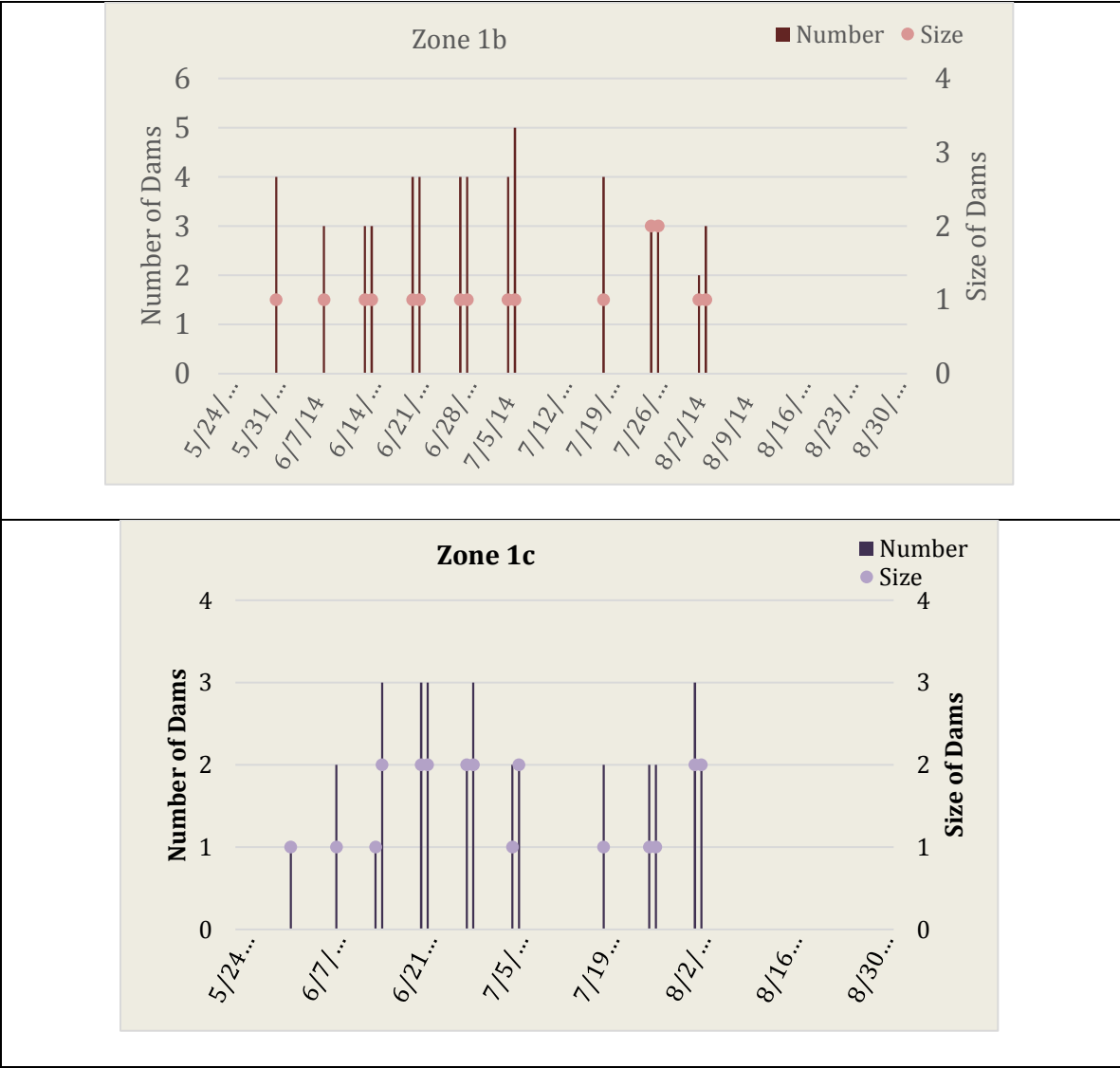


The next series of photos and tables shows each zone and sub-zone. The relevant tables show the number and approximate size of dams in each zone. The size of a dam is determined with arbitrary ordinal ranking ranging from one (smallest) to four (highest.) Our first glance at these rock dam data suggest that over the summer the number of dams remained stable at this particular location, but the size of dams increased. We underscore that these data

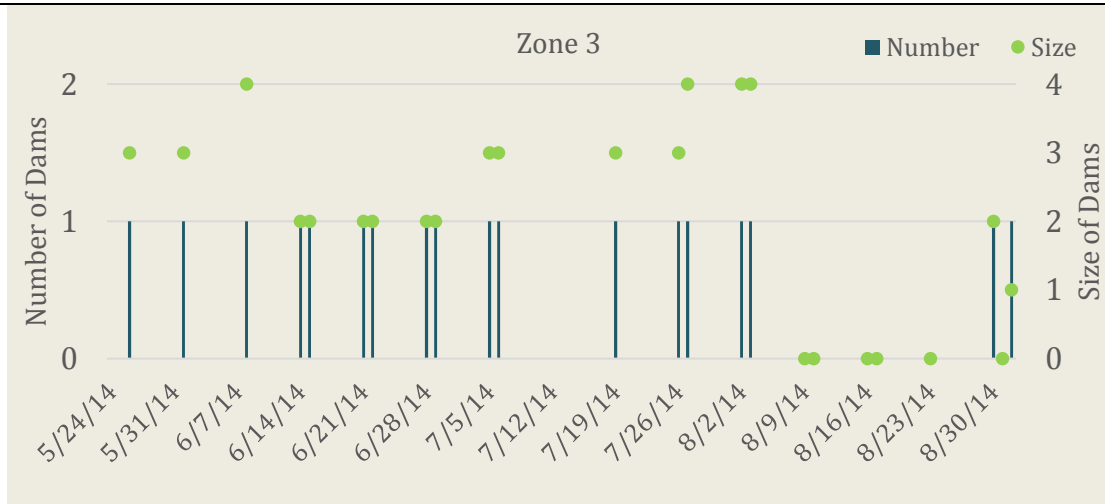
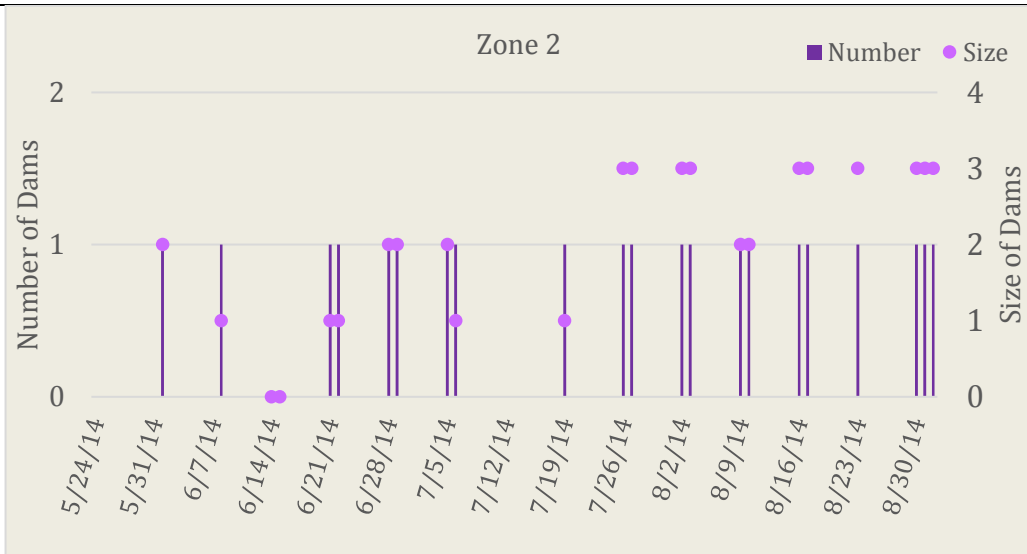
observation alone do not indicate anything about the effectiveness of the Educational Program. Ultimately, whether the Educational Program is judged effective depends on some quantitative comparison of rock dam construction in the absence of the Program. This, in turn, requires developing a systematic method to quantify incremental changes in the rock dams and then compare these data against days that the Program was absent on the river.

Zone 1

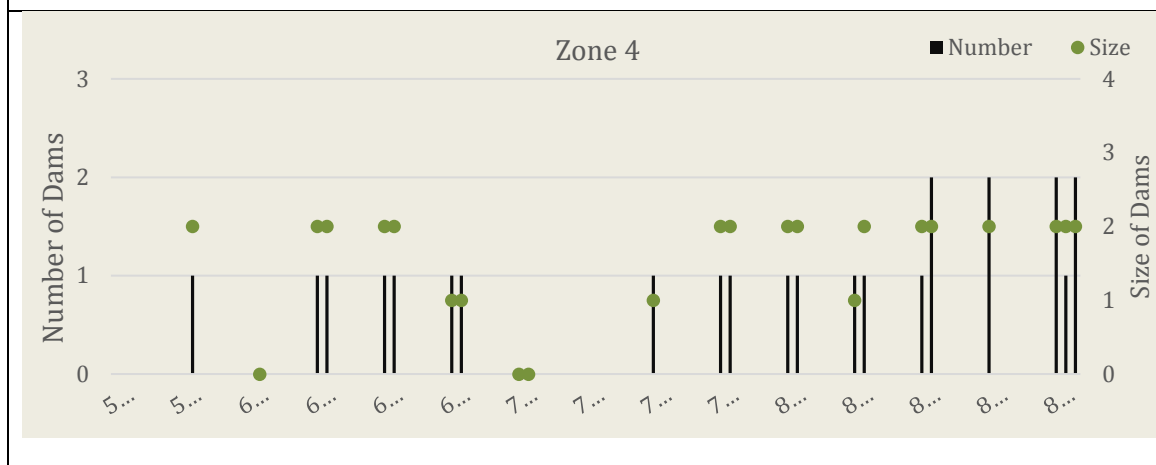




Zone 1 and Zone 2



Zone 4



Assessment Outcomes: Preliminary Results from Poisson Regression Models

Did Visitors Learn from Outreach Contacts? And, if so, how much? To address this question, we ultimately need to estimate the quantitative relationship between *Correct Assessment* responses and Education/Outreach contact, holding constant other factors (visitor characteristics, use levels, etc.) A simple approach is to estimate changes in *Total Correct Answers* (to questions) as a function of *Outreach Contact*, holding constant *Visitor Characteristics* and other variables that may affect learning/retention outcomes. In this way, we can understand the measurable impact of, say, an additional *Outreach Contact* on the number of questions respondents answered correctly. That is, we want to disentangle various factors that determined a visitor's correct responses, allowing us to parcel out the marginal effects of *Outreach Contact*.

As a preliminary approach, we regress respondents' total number of correct assessment answers (dependent variable) on measures of *Outreach Contact* and other variables identified as possible determinants of the number of correct answers.

We included four measures of *Outreach Contact*:

- Visited Canopy: 1 = respondent visited stationary interpretive booth; 0 otherwise.
- Interacted with Roaming Rangers: 1 = respondent visited interacted with Roaming Rangers; 0 otherwise.
- Total Visitor Group Contact with Outreach: sum of contacts (respondent and others in group) with either Interpretive Booth or Roaming Rangers.
- Outreach Program Onsite: 1 = Outreach Program onsite on day of visitor interviewed; 0 if absent.

The following table outlines the general results of our estimates (detailed results are available from the authors.) The table shows that respondents who visited the interpretive booths received higher numbers of correct answers on the assessment questions; but these results are mixed from a statistically significant standpoint.

Dependent Variable: Total Correct Responses			
	Variables	Sign	Comments
Contact with Outreach Team	Visited Canopy	+	Weak statistically
	Interacted with Roaming Rangers	+	Effects stronger than Canopy
	Total Visitor Group Contact with UCC (Canopy, Rangers)	+	Consistent statistically
	UCC was onsite	+	Weak statistically
Visitor Characteristics	Previous Visits to SGR	+	Strong Statistically
	Household Income	+	Consistent
	Education Level	+	Correlated w/income
	Connected to Nature Scale	+	Mixed Results

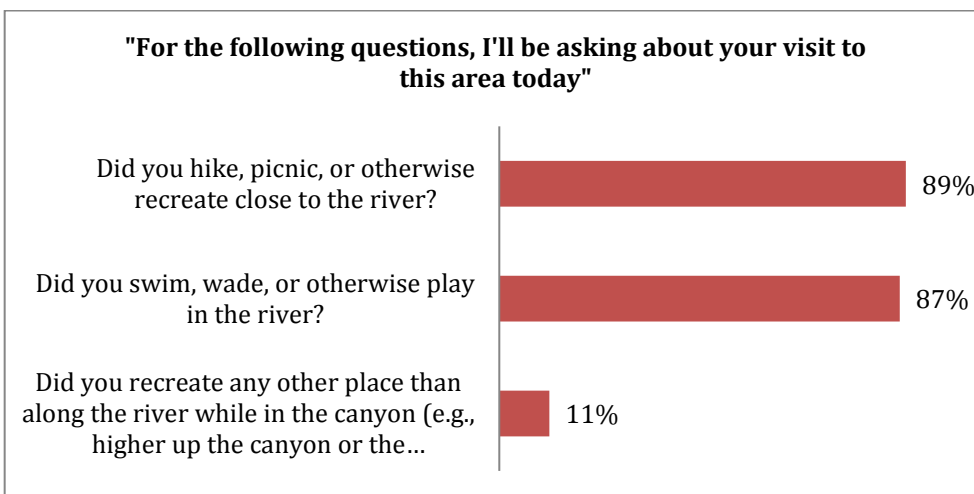
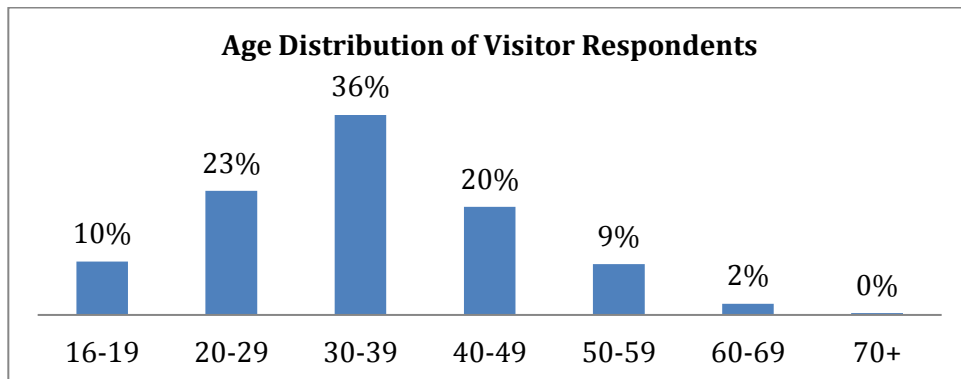
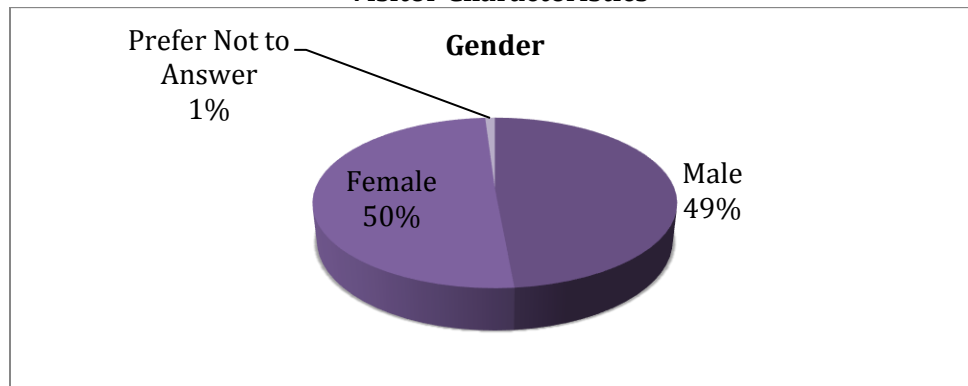
Visitor contact with the Roaming Ranger component of the Educational Program produced consistent results (in statistical significant sense.) Furthermore, there appears to be a greater quantitative impact on learning (correct answers) from contact with the Roaming Rangers as compared to respondents who reported visiting the Interpretive booth, a result that may reflect the Program's emphasis on connecting with visitors along the river.

Overall, there appears to be a positive impact of *Total Group Contact* (visitor, others in group, Canopy, Roaming) on learning outcomes – that is, this measure of *Total* contact appears to “raise total test scores” and at statistically significant levels. This is suggestive that contact with visitors improves their understanding of the river resources, at least to some degree, although at this stage we cannot distinguish whether this is result of particular aspects of the curriculum or simply through presence on the river. Thus, we report some positive signs, although mixed, that contact with the Educational Program improved responses to assessment questions. (Quantitative sizes of the marginal impacts are not reported at this time.)

The number of previous visits to the Canyon reported by a respondent was the strongest result, and most consistently positive indicator of the number of correct answers a respondent reported. Likewise, higher income and education levels (within some ranges) show some positive impacts on the number of questions a respondent answered correctly.

The data and results reported here are consistent but should not be interpreted as evaluations of the Education Program effectiveness. This report is intended to provide a summary of data collected by the CSUSM team during Summer 2014.

Appendix Visitor Characteristics



Travel -- Distance and Time	
How far from home did you travel to get here? (distance in miles)	How much time did it take to drive here? (minutes)
<ul style="list-style-type: none"> Average: 41 Median: 40 Standard Deviation: 25 	<ul style="list-style-type: none"> Average: 59 Median: 60 Standard Deviation: 29

<ul style="list-style-type: none">• Low: 5• High: 330	<ul style="list-style-type: none">• Low: 5• High: 360
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